

Observations on Two Dwarf *Dypsis* Species in Betampona, Eastern Madagascar

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Dypsis schatzii and *D. betamponensis* are two beautiful dwarf palms, restricted to a very small area of eastern Madagascar. This paper describes them in detail and provides much new information about their occurrence.

Since August 1997 I have been employed by the Madagascar Fauna Group (MFG), a consortium of zoological parks in the U.S. and Europe, as research co-ordinator for the black and white ruffed lemur re-stocking project at the Betampona Reserve (Britt et al. 2000). Obviously my main focus is on the lemurs, but long term residence at Betampona has allowed me to develop varied interests in other fauna and the flora. I first came across the book, "The Palms of Madagascar" (Dransfield & Beentje 1995) at a colleague's house in 1998. I was intrigued by the fact that two species of dwarf palm were recorded only from Betampona. *Dypsis schatzii* was known still to occur, but *Dypsis betamponensis*, known from a single specimen, was thought to be extinct as it had not been seen for seventy years. It seemed odd to me that a dwarf palm, which was not used by the local people, should disappear when the forest at Betampona remained relatively intact. Following a brief visit to Betampona (one afternoon) by John Dransfield in 1999 I became determined to "re-discover" the species, but it was not until the year 2000 that I began seriously looking. Unfortunately the

illustration in Dransfield and Beentje (1995) of material collected by Perrier in 1929 is not very representative of the species. There was a clustering dwarf palm in the reserve that looked similar, but was considerably taller with much broader leaves than was described. However, in October 2000, this species flowered, and from the appearance of the inflorescences I became convinced that this was the elusive *Dypsis betamponensis*. Confirmation came, when in February 2001, I was invited to give a presentation at Kew about the MFG's work at Betampona. As I hoped, John Dransfield was in the audience. I clicked up a slide of *Dypsis betamponensis* in flower and said "two species of palm are known only from Betampona". Tentatively I inquired "I believe this is *Dypsis betamponensis*, is it John?" – and it was!

This short paper provides further description of both these dwarf *Dypsis*, information on their ecology, locations of sites outside of Betampona where these species occur, and comments on their conservation.



Betampona and nearby forests

The Betampona reserve was originally established in 1927 and later became the first of the Réserves Naturelles Intégrales (Strict Nature Reserves) created by Decree 66-242 of 1st June 1966 (Andriamampianina & Peyrieras 1972). The reserve covers an area of 2228 ha of lowland dense evergreen rain forest. It is situated between 17°15'–17°55' S and 49°12'–49°15' E, on the east coast of Madagascar, 40 km north-west of the city of Toamasina. Altitude ranges from 275–650m above sea level. In the late 1950's the Betampona forest was continuous with two nearby classified forests, Sahivo and Antanamalaza (Britt et al. 1999), but now stands completely isolated.

Unfortunately the reserve has not been spared from human incursion and it is currently estimated that only around 50% of the area remains as primary lowland rain forest, with large regions of degraded secondary forest, especially around the boundary, characterized by the presence of the Traveller's Tree (*Ravenala madagascariensis*) and exotic species, particularly Chinese Guava (*Psidium cattlyaena*). Evidence of previous cultivation within the reserve is provided by vast monospecific stands of 'longoza' (*Afromomum augustifolium*). The remaining

1 (left). *Dypsis schatzii* in flower at Betampona, Dec. 2000. 2 (below). The crown of *Dypsis betamponensis*.



primary forest at Betampona is dominated by trees of the families Lauraceae, Moraceae, Euphorbiaceae, Clusiaceae, Sapotaceae, Myrtaceae, Arecaceae, Liliaceae and Burseraceae, lianas of the families Dilleniaceae and Apocynaceae, and numerous epiphytes of the families Aspleniaceae and Orchidaceae (B. R. Iambana pers. comm.). The canopy height averages 20–25m and is very broken, with occasional large emergents taller than 30m. The terrain is steep with numerous ridges. The climate is humid tropical. Mean annual temperatures range from 21–24°C and annual rainfall averages 2500–3000mm. There are no dry months and humidity within the forest remains generally higher than 90%. Rainfall peaks from January to March and June to August, while October and November are relatively dry. Temperature falls markedly between June and September with a mean of 18°C.

The reserve is currently managed by l'Association Nationale pour la Gestion des Aires Protégées (ANGAP) – with the Chef de Reserve and four agents based in the village of Fontsimavo some 4 km from the reserve. The MFG's "Project Betampona" team are based in the village of Rendrirendry at the south-western corner of the reserve.

Other sites surveyed were the Sahivo (17°53' S, 49° 10' E) and Antanamalaza (17° 50' S, 49° 11' E) classified forests and the Ambakaka forest (17° 52' S, 49° 10' E), which is sacred to local people. The two classified forests consist of a few small fragments of highly disturbed forest, which are rapidly being cleared for rice cultivation. At Sahivo there are no fragments larger than 5 ha, while Antanamalaza is somewhat less devastated with a couple of blocks which may be up to 15 ha. Ambakaka is a relatively intact block of about 30 ha.

Dypsis schatzii Beentje

This species is known locally as 'amboza'. The stems were formerly used to make blowpipes, but hunting with blowpipes is no longer practised in the region. *Dypsis schatzii* is widespread at Betampona and certainly numbers are in the mid hundreds. Distribution is patchy, but it can be very common where it occurs. For example, 30 plants were counted in an area of 500 m² along the main ridge in the reserve. It is most commonly found in primary forest along the tops of ridges, but also occurs on steep mid slopes and in the bottoms of valleys. *Dypsis schatzii* was also located in the Ambakaka forest (c. 20 plants recorded), but was not seen at Sahivo or Antanamalaza.

Dypsis schatzii is usually solitary, but does occasionally occur in clusters of 2 to 7 stems. Stems



3. Close-up of *Dypsis betamponensis* inflorescence, Nov. 2000.

are usually unbranched, but one specimen has been observed with a branched stem. The stems of mature plants are 1.62–3.75 m in height (mean = 2.66 m ± 0.62, n = 20). It should also be noted that the length of the crown is often 1 m or more. Stem diameter ranges from 12 mm just below the crown to 28 mm at the base. Nodal scars are distinct distally but become indistinguishable towards the base. Internodes are 20–48 mm long. Leaves are usually entire, but sometimes have 2 pinnae, usually on only one side of the apex. The elongated crown consists of 8–22 leaves (12–15 being most common) and there is no crownshaft. Leaf sheaths are 52–90 mm long, the remnants of which usually clothe the distal part of the stem. Leaf lengths are 170–486 mm (mean = 359.9 mm ± 79.7, n = 35). The leaf rachis is 140–440 mm long (mean = 316.7 mm ± 75.0, n = 35). Maximum leaf width is 95–182 mm (mean = 137.7 mm ± 25.5, n = 35). Petioles are often absent but can reach up to 116 mm in length. The apices and the leaf edges to around halfway down the leaf are dentate. The interfoliar inflorescences, which are branched to one order and covered in yellow flowers, appear in September. Peduncle length is highly variable,

from 2–134 mm, as is prophyll length, at 50–190 mm. Two bracts are present. The inflorescence rachis is 42–208 mm in length and has 3–6 first order branches (5 being most common). The branches are covered in reddish stellate scales. Fruiting occurs from October to December. The pink fruits are a little over 10 mm long and narrowly ovoid.

Dypsis betamponensis (Jum.) Beentje & J. Dransf.

This species is known locally as 'vonombodidronga.' This name means "tail of the Drongo" – the Crested Drongo (*Dicrurus forficatus*) is a common Malagasy bird with a forked tail – thus the name refers to the similarly shaped leaves of *Dypsis betamponensis*. The species is apparently not used by local people. *Dypsis betamponensis* is abundant at Betampona, with numbers estimated to be in the high hundreds (possibly more than 1000). One of the main reasons I doubted my initial identification was the fact that this palm was everywhere in the reserve! The species has been observed in primary forest on ridge tops, mid-slopes and at the bottoms of valleys. *Dypsis betamponensis* was also recorded at Ambakaka and Antanamalaza, but not at Sahivo.

Dypsis betamponensis generally occurs in clusters of 2 to 14 stems, although it is occasionally solitary. The unbranched stems of mature plants are 1.6–4.4 m tall (mean = 2.99 m \pm 0.82, n = 20). Stem diameter ranges from 10 mm just below the crown to 22 mm at the base. Nodal scars are very distinct, with internode distances of 8–80 mm. The crownshaft is 71–140 mm in length (mean = 112.2 mm \pm 22.3, n = 20). Leaves are entire and much broader than cited in Dransfield and Beentje (1995), with sparse reddish scales and dentate apices. Leaf lengths are 400–670 mm (mean = 530.5 mm \pm 65.7, n = 41). The leaf rachis is 150–368 mm in length (mean = 268.4 mm \pm 51.2, n = 41). Maximum leaf width is 110–211 mm (mean = 161.5 mm \pm 26.5, n = 41). While petioles are most commonly absent, petiole lengths of up to 80 mm have been recorded. The crown consists of 4–9 leaves (7 and 9 being most common). The inflorescence is interfoliar and much-branched to 2 orders. Peduncle length is highly variable, from 10 to 140 mm, as is prophyll length, 64–152 mm. Two bracts are always present. The inflorescence rachis is 82–320 mm in length, with 15–31 first order and 12–25 second order branches. The rachis is sparsely covered in red curly hairs, up to 2 mm in length. Flowering begins in September and fruiting has been observed in December. The red fruits are about 10 mm long and roundly ovoid. One plant was observed with an aerial root descending to the ground from a height of ca. 30 cm on the stem.

It appears that the leaf of *Dypsis betamponensis* illustrated in Dransfield and Beentje (1995) is from a young plant and not a mature specimen.

Conservation

As long as the continued protection of the Betampona reserve can be assured, the future survival of *Dypsis schatzii* and *D. betamponensis* seems to be secure. However, only one individual of *D. betamponensis* has been observed to produce fruit, and only a few of *D. schatzii*. It is unclear why this should be so. Their absence from Sahivo suggests that they do not tolerate habitat disturbance well. They are certainly reliant upon the perhumid environment of low altitude rain forest. While it is encouraging to be able to report range extensions for both species at Antanamalaza and Ambakaka, the future of both these forests seems bleak. I have observed with dismay the rapid reduction of forest cover at Antanamalaza and Sahivo since 1997, from over 100 ha of forest at each site to the current situation described in the introduction. Although these species may occur in other forest patches, their distribution must be regarded as extremely limited and fragmented.

It is proposed to establish a living palm collection at Parc Ivoloïna, near Toamasina (C. Welch pers comm.). Attempts should be made to establish both these species in cultivation as part of this collection. Such action would provide a safeguard for both species against the potential total loss of natural habitat within their limited range.

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